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AUTHOR Huang, Ya-Rong
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ABSTRACT

This study examined the accentuation effects of academic majors on the work values of undergraduates at four-year colleges and universities, focusing on five variables: (1) career eminence; (2) financial success; (3) administrative leadership; (4) expression of artistic creativity; and (5) altruism. It is based on Holland's theory of career choice as a conceptual framework, in which most individuals can be categorized as one of six types based on their vocational interests: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional (RIASEC). Using student data (n=3,000 students) from the Cooperative Institutional Research Program 1985-89 database, sponsored by the Graduate School of Education at the University of California, Los Angeles and the American Council on Education, the study classified student majors using the RIASEC typology and examined their effects on the five variables. It found that the six types of majors differed significantly in all of the work values except career eminence. For financial success and administrative leadership, the Enterprising, Conventional, and Realistic types had higher mean scores than the Social, Investigative, and Artistic types. Regarding expression of artistic creativity, the Artistic type had significantly higher scores than the other types, while on altruism, the Social and Artistic types scored highest. (Contains 32 references.) (MDM)

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Ya-Rong Huang

Graduate School of Education and Information Studies

University of California, Los Angeles

1995 ASHE Conference, Orlando, Florida

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(409) 845-0393

This paper was presented at the annual meeting of the Association for the Study of Higher Education held at the Marriott Hotel, Orlando, Florida, November 2-5, 1995. This paper was reviewed by ASHE and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC collection of ASHE conference papers.

The Accentuation Effect of Academic Majors on Undergraduate Work Values and Holland's Theory

Ya-Rong Huang

Graduate School of Education and Information Studies

University of California, Los Angeles

1995 ASHE Conference, Orlando, Florida

Holland's (1973, 1985) theory of career choice proposes that model environments reinforce the characteristic predispositions of their corresponding personality types. Based on a national and longitudinal data, this study categorizes academic majors into the RIASEC types and tests Holland's hypothesized reinforcement effect of model environment to investigate the influence of academic majors on five work values. The results of the multiple regressions support that these model environments have accentuation effects on the work values of financial success, administrative leadership, expression of artistic creativity, and altruism, and the effects are in the expected direction. The difference in strength among the six types of majors regarding their accentuation effects on their respective work values is also discussed.

Work values, in terms of what one expects from work, play a crucial role in an individual life and career development. They determine the degree to which one person separates work from leisure, interest, and family life. They also influence career choices and development. People tend to select careers that are consistent with their work values, or else change their work values in the direction of the dominate values in their chosen fields of work (Underhill, 1967). Work adjustment and satisfaction are closely related to work values as well (Dawis and Lofquist, 1984; Mobley and Locke, 1970). Above all, work values are linked with a nation's productivity. A nation will be more productive if the aggregate work values of the work force are focused on self-expression, self-fulfillment, advancement of human knowledge, and service to society. Conversely, a nation's productivity is retarded if the work force tends to equate work with labor, and to

be concerned merely about personal gains. Changing the work values of a nation' s work force potentially affects the national productivity.

Work values are not static; they change as a person grows. They are least stable during the postsecondary years when many crucial decisions are being made about career (Osipow, 1983). During this period of time, college education is a crucial variable for the socialization of students' work values because colleges and universities represent a complex socio-psychological environment where exposure to a wide variety of people and experiences can bring out tremendous changes in students' attitudes, beliefs and values. Consequently, it is essential to understand to what degrees and in what ways college students' work values are shaped by their college environments so that the relationships among higher education, work, and society can be articulated more clearly.

Among other college environments, this study chooses to focus on academic departments due to the following reasons. First, they are an organizational element with which practically all students will have some affiliation during their college years. In addition, each department is characterized by a set of goals and missions, attracts different types of faculty and students, and provides a unique combination of curricula. Furthermore, the socialization power of academic departments on individual values has been speculated by several researchers (Bradshaw, 1975; Weidman, 1989; Vreeland and Bidwell, 1966; Merton, 1957) from the perspectives of peers, faculty, departmental goals, or anticipatory socialization. Above all, empirical evidence (Davis, 1965; Goodwin, 1969; Underhill, 1967) consistently indicates that students in different fields of study espouse different sets of work values. In summary, it is reasonable to assume that an interactive relationship exists between academic majors and undergraduate work values.

Yet, little research attention has been given to the impact of academic majors on work values in spite of its practical significance. Pascarella and Terenzini (1991) in their extensive review of literature note that "studies of within-college effects in the area of educational and occupational values focus almost exclusively on students-faculty

interactions" (p. 308). Thus, it is necessary to look to studies on the effect of majors on other student outcomes for guidance. In reviewing these studies, two major problems emerge. First, there is a wide variation in the ways researchers categorize academic majors. Some researchers take whatever individual majors available and throw them all into analyses without classifying them in a systematic way, while others categorize majors into some broad and convenient categories. The lack of consensus in categorizing academic majors makes it difficult to compare across studies. Second, the categorization of academic majors and the construction of hypotheses of most studies are not guided by theories or models. Therefore, their interpretations of the results are at best descriptive and may even be arbitrary.

A lack of theoretical framework particularly has a serious implication for future research. For example, using a national and longitudinal database, Weidman (1979) explored how academic departments affected students' intrinsic (creativity), extrinsic (administrative leadership, financial success, career eminence) and people-oriented (helping others) values. Five academic departments in the senior year were examined: history, mathematics /statistics, economics, political sciences, and English. Additionally, a variable was created to represent a change of major. The regression results showed that these academic departments had an influence on these values after the pretest scores, students' degrees of campus integration, normative and interpersonal environment in the departmental environments were taken into control. Significant effects are as follows: the economics department had a positive effect on administrative leadership; the history and English departments had negative effects on financial success; and the English department had a positive effect on creativity. As informative as his findings are, future researchers have little to benefit from his study in proposing hypotheses. Without building on a theoretical framework, the immersion in details in his study simply makes us lose an overall perspective.

One promising direction of studies in this area is to use Holland's (1973, 1985) theory of career choice as a conceptual framework. Essentially, based on an assumption that the description of an individual's vocational interest is a description of the individual's personality, Holland establishes a typology for personalities to measure vocational interest. He proposes that accordingly to capabilities, preferences, and values, most persons can be categorized as one of six types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC). Through a major investigation into the relationships among the six types, Holland (Holland, Whitney, Cole, and Richards, 1969) found that these six types are related to each other differentially. He presented a hexagonal model to depict the psychological similarity across types. Each type is represented by one of the points of a regular hexagon. The order of personality types around the hexagon is Conventional, Realistic, Intellectual, Artistic, Social, Enterprising, and back to Conventional. The distance along a straight line between any two points in the hexagon indicates the relative similarity between the two corresponding personality types. Because people tend to search for environments that will let them express their skills, abilities, and values, Holland further proposes that environments can also be characterized into these six types. The congruence between types of personality and environment is then used to explain and predict one's career choice, stability, and change.

Holland's theory is useful to the investigation of the effect of academic majors in two ways. First, its classification scheme of occupations and working environments can be used to categorize academic majors in a meaningful way. Second, Holland's hypothesis about the mutually reinforcing relationship between personality and modal environment lends us a perspective to investigate the influence of academic majors on students. Holland maintains that each model environment not only is populated by its associated type of people but also reinforces the characteristic patterns of attitudes, competencies, and interests of their associated personality type. Thus, if academic majors are categorized as

Holland's six model environments, then academic majors should reinforce their associated characteristics and traits.

Walsh and his colleagues (Walsh and Lacey, 1969, 1970; Walsh, Vaudrin, and Hummel, 1972) conducted a series of studies dealing with the impact of Holland's model environments on the individual student's perceptions of personal change over time. Their results generally support the utility of Holland's theory. Yet, Walsh's studies have one major flaw: the observed student change over time is directly taken as the result of exposure to academic majors. As a matter of fact, student change can be a result of maturation, external social forces, students' family backgrounds, and/or other collegiate factors.

Smart (1985) also tests the hypothesized reinforcement effect of Holland's model environments. Using a national and longitudinal database (CIRP 1971-1980), he investigated the association between students' intellectual, artistic, and leadership self-esteems nine years after entering college and Holland's model environments across eight types of colleges and universities. The scores of the three self-esteem scales at college entry, degree attainment, and job-major compatibility were taken into control in the analyses of covariance. The results also support the validity of this premise. However, Smart's study is faced with a limitation -- the effects of academic majors and post baccalaureate experiences are mixed together. Although he controls for the congruence of types between undergraduate majors and their current jobs in the analyses, his findings are still challenged by the possibility that the observed changes are affected more by the working environment, as opposed to the undergraduate departmental environment, since the working environment can provide more tangible and more profuse rewards to their members. The direct effect of Holland's types of academic majors on students remains largely unknown to us. Besides, only three out of six model environments are examined in his study.

Because Holland's theory appears to be valid and useful, this study follows this line of research and uses this theory as a conceptual framework to investigate the

accentuation effectsof academic majors on work values. To improve the limitations of the previous studies, this study observes student value development within a four-year period to eliminate the influence of post baccalaureate experiences, examines all Holland's six types of environments, and most importantly, takes into account other potential sources of influences on the outcomes with more robust methods.

METHODOLOGY

Data Source

The participants of this study are drawn from the Cooperative Institutional Research Program (CIRP) 1985-1989 database. Sponsored by the Graduate School of Education at the University of California, Los Angeles and American Council on Education, CIRP annually follows up a national sample of college freshmen four years after college to assess the impact of college environment on them. This database is used because of its virtues of being national and longitudinal.

Approximately 280,000 students at over 500 institutions filled out a freshman survey in 1985 when they entered college. The freshman survey included information on students' demographic data, high school experiences, educational and career aspirations, and social and political values and attitudes. A smaller group of the original population were followed up four years later in 1989. The 1989 Follow-UP Survey (FUS) asked students questions about their academic and social experiences during college, curricular patterns, majors and intended career, and a variety of values and attitudes. Complete description of sampling methods and survey design is provided in The American College Student, 1989.

Because this study focuses on the effect of departmental environments on students, students who were in two-year institutions are excluded to control for the difference in

length of exposure to departmental environments between four-year and two-year institutions. Furthermore, to keep all racial groups equally represented in the analyses, only ten percent of the Caucasians from the original population is extracted to be included in the sample. The final sample amounts to approximately three thousand students.

Work Values

Five work values are included for examination in this study. They are termed career eminence, financial success, administrative leadership, expression of Artistic creativity, and altruism. They represent the common goals that people hope to achieve in their careers, namely, fame, money, power, self-expression, and helping others. These five work values are measured by either one or two item questions that asked students to indicate how important miscellaneous values and goals were to them personally, by choosing one of the following four categories: "not important (1)," "somewhat important (2)," "very important (3)," "essential (4)". The item questions that measure these five work values are listed as follows.

Factor I: Career eminence
- becoming an authority in my field
- obtaining recognition from my colleagues for contribution to my special field

Factor II: Financial Success
- being very well-off financially
- being successful in own business

Factor III: Administrative Leadership
- have administrative responsibility for the works of others

Factor IV: Expression of Artistic Creativity
- writing original works
- creating Artistic work

Factor V: Altruism
- helping others in difficulty

These item questions appear both in the freshman and follow-up surveys; therefore, these five work values have a pretest score in the freshman year, and a posttest one in the senior year. The posttest scores are the dependent variables in this study. Since each item question is scored in a four-point scale, career eminence, financial success, and expression of artistic creativity have a scale scored from two to eight, whereas the other two work values remains to have a four-point scale.

Academic Majors: The RIASEC Types

In order to categorize academic majors into Holland's six types, Holland's descriptions of the traits of the six model environments (Holland, 1973, pp. 29-33) are first excerpted in the following.

The Realistic environment is characterized by technical competencies and achievement. It encourages people to see themselves as having a mechanical ability, and as lacking an ability in human relations. Being persistent, frank, masculine, stable, and practical are stressed in this environment. It rewards them for display of conventional values and goods, such as money, power, and possessions.

The Investigative environment encourages mathematical and scientific competencies and achievement. It encourages people to see themselves as scholarly, analytical and rational, and as lacking in leadership ability. It encourages them to see the world in complex, abstract, independent and original ways. It rewards people for the display of scientific values.

The Artistic environment fosters artistic competencies and achievement. It encourages people to see themselves as expressive, introspective, original, unconventional, and idealistic. It rewards people for the display of esthetic values.

The Social environment stimulates people to engage in social activities. It encourages people to see themselves as liking to help others, understanding of others, cooperative, flexible, and sociable. It rewards people for the display of social values.

The Enterprising environment is characterized by enterprising competencies and achievements, such as selling, or leading others. It encourages people to see themselves as aggressive, popular, self-confident, and as possessing leadership and speaking ability. It encourages them to see the world in terms of power, status, responsibility, and in stereotyped, constricted, dependent, and simple terms.

The Conventional environment fosters conventional competencies and achievements, such as recording and organizing data or records. It encourages people to see themselves as conforming, orderly, non-artistic, and as having clerical competencies. It rewards people for the display of conventional values: money, dependability, conformity.

Guided by these descriptions as well as other researcher's (Healy, 1995) work, more than seventy fields of study that are available in the existing CIRP 1985-89 database are classified into the six types as follows.

Enterprising:	business (business administration, finance, marketing, management, others), economics, laws
Social:	education (business education, elementary education, physical education, secondary education, special education, others), home economics, nursing, therapy, anthropology, ethnic studies, geography, political science, psychology, social work, sociology, women's studies, other social science
Artistic	fine arts, English, history, journalism, language or literature, music, philosophy, speech, theater, theology, other arts and humanities, architecture, library science, communication

Realistic	technical (building trades, mechanics), agriculture, forestry law enforcement, military science
Investigative	biological science (biology, biochemistry, botany, marine science, microbiology, zoology, others), engineering (astronautical, civil, chemical, electrical, industrial, mechanical), physical sciences (astronomy, atmospheric science, chemistry, earth science, marine science, math, physics, statistics), health technology, premed, computer programming, computer science, drafting, electronics
Conventional	secretarial studies, accounting

To notice, several engineering majors are labeled as the Investigative types even though their major corresponding occupations belong to the Realistic types because these college majors often require abstract intelligence.

Hypotheses and Analytical Methods

Holland proposes that model environments not only attract but further reinforce the distinctive attitudinal and behavioral patterns of their respective members. Thus, it is hypothesized that academic majors as six model environments have accentuation effects on their associated work values. To investigate the accentuation effects, several factors that may contaminate the results need to be controlled. First, because students who choose different majors tend to have different work values in the very beginning, it is necessary to hold constant their work values at the entry of college so that the accentuation effect is not confounded by the recruitment effect. Second, researchers (Weidman, 1989) suggest that students' background characteristics are one of the important sources of influence on their affective outcomes. Therefore, students' background characteristics that have been found by previous literature to be related to work values need to be controlled as well. Third,

Anderson (1985) proposes that as more and more students continue some forms of postsecondary education, increasing differentiation among colleges in role allocation of students into social class is necessary to keep college education from depreciation. Different institutional types in higher education may train students in behavioral and attitudinal traits suited to the social class origins and destinations of students. Thus, institutional structural characteristics also have to be taken into control.

To observe the accentuation effect of departmental environment while taking into account the above mentioned other sources of influences, this study chooses multiple regressions as analytical methods. In practice, each of the five work values in the senior year is regressed upon all six types of majors after the following three blocks of variables are added into the regression sequentially:

Block 1: the pretest score of the work value in the first year,

Block 2: students' background characteristics -- gender, race, socioeconomic status, SAT composite scores, sex role attitudes, religion, and

Block 3: institutional structural characteristics -- institutional sex composition (male-only, female-only, coeducational), and Carnegie's types of institutions (research universities, comprehensive universities, liberal arts colleges, special institutions)

To assess the effects of the six types of majors, their betas, or the standardized regression coefficients, after block three and when block four are added to the regressions are essential because these two kinds of betas provide different information to us. After block three is controlled, the betas show us the effects of the six model environments of academic majors on work values that are independent of individual and institutional variance. The betas after block four is controlled indicate the relative strength of the effects among the six environments because these six environments are added simultaneously to the regressions in one block and have to compete with each other for predictive power.

Central to the investigation of accentuation effect of model environments is the premise that the six model environments differ significantly in work values. Therefore, prior to the regression analyses, a test of this premise by analysis of variance is conducted. Descriptive statistics of the six environments are also presented to delineate how the six types differ. Multiple regression analyses are performed only for work values that differ significantly by types.

Results and Discussions

Differences in Work Values among the Six Environments

Table 1 presents the results of analysis of variance. These six types of majors differ significantly ($p<.001$) in almost all work values except for career eminence. Because a significant difference among the six model environments is the assumption underlying the accentuation effect of the model environments, regression analyses for the investigation of accentuation effect are not performed for career eminence.

Table 1

The Differences in Work Values by Academic Majors: means and F-ratio

	Career Eminence	Financial Success	Admin. Responsibility	Expression of Creativity	Altruism
Types of Majors					
Realistic (n=36)	5.67	5.01	2.49	2.58	2.75
Enterprising (n=533)	5.49	6.03	2.79	2.94	2.96
Artistic (n-602)	5.52	4.78	2.19	4.29	3.00
Social (n=837)	5.41	4.67	2.32	3.13	3.17
Investigative (n=855)	5.47	4.93	2.28	2.95	2.91
Conventional (n=149)	5.32	5.55	2.64	2.51	2.79
F ratio	.79	54.63***	31.85***	89.60***	14.36***

*p<.05, **p<.01, ***p<.001
DF=5

The absence of a significant different in career eminence across types is intriguing because at the very least, the Enterprising, Realistic, and Conventional environments should differ from the Investigative, Artistic, and Social environments in this extrinsic value. One potential explanation is that this value means different things to different fields of work. Although it is generally held to be an extrinsic value, career eminence may represent to some types of majors a pursuit for self-fulfillment or a desire to master knowledge to some majors. Therefore, students who do or do not value the importance of becoming an authority and obtaining recognition from others are distributed fairly equally across the six types of departmental environments.

For financial success and administrative leadership, the Enterprising, Conventional, and Realistic types have higher mean scores than the Social, Investigative, and Artistic types. This shows the basic distinction among these two camps in extrinsic values. Regarding expression of artistic creativity, the Artistic type scores much more higher than all other types, whereas the Conventional type has the lowest mean score. As to the value of helping others, the Social and Artistic types score highest and are followed by the Enterprising, Investigative, and Conventional types. The Realistic type scores the lowest in this value. These differences among the six types correspond well to Holland's theory.

Financial Success

The results of regression analysis on financial success are reported in Table 2. After the pretest score, students' backgrounds, and institutional structural characteristics are taken into account, the Enterprising environment has a positive effect whereas the Social, Artistic and Investigative environments have negative effects (see Table 2). The positive effect of the Enterprising environment is well expected because this type is known to be pragmatic and materialistic. So is the negative effects of Investigative environment because

this type is psychologically distinct from the Enterprising type. Yet, it is noteworthy that although the Social and Enterprising types are adjacent to each other in the hexagon, they are far apart with regard to economic values, such as financial success in this case.

Table 2

Six Types of Academic Majors and the Value of Financial Success:

standardized regression coefficients

	β after controlling for block			
	1	2	3	4
Majors that enter the regression				
Enterprising	.14***	.14***	.14***	.10***
Social	-.09**	-.08***	-.08***	-.09***
Artistic	-.06***	-.04*	-.03*	-.06**
Investigative	-.04**	-.03	-.03*	-.05**
Realistic	-.02	-.03	-.03	-.03*
Major that does not enter the regression				
Conventional	.02	.02	.02	.01

Note. Multiple R=.56

Other variables that enter the regression are as followed.

Block 1 : pretest

Block 2 : students' background characteristics (being Black, being White, being Mexican, sex, father's education, father's career as a businessman, SAT composite score, sex role attitudes, being Protestant)

Block 3 : Institutional structural characteristics (liberal arts colleges)

*p<.05, **p<.01, ***p<.001

The psychological dissimilarity between these two types in some aspects has been noted by researchers. Wakefield and Doughtie (1973), in an attempt to test the validity of the hexagonal model of Holland's theory in describing the relationship of the six types, test the hypothesis that the distance between any two types that are one type apart would be greater than the distance between two adjacent types and less than the distances of two diametrically opposed types. Their results show that the relationship between the Enterprising and Social types violates this hypothesis. The negative effect of the Social

environment on financial success is probably because its emphasis on helping others, though not directly related to wealth, has side effects on students' interest in wealth.

The beta of the Realistic environment becomes significant right after the Investigative environment is controlled. This occurs because these two types are psychologically close to each other. The negative effect of the Realistic type may appear unreasonable at first because this type supposedly "values concrete things or tangible personal characteristics -- money, power, status" (Holland, 1973, p. 14). Yet, considering the fact that the occupations of this type tend to be moderately low-status jobs, the negative effect makes sense because the Realistic workers may be more concerned about economic security and stability, rather than financial success.

The Conventional environment surprisingly does not have a significant effect in spite of the fact that its mean score on this value is comparatively high (see Tables 1 & 2). This illuminates that model environments whose members are high in a particular value do not necessarily have a strong reinforcement effect on that value.

Administrative Leadership

Table 3 shows the regression results on administrative leadership. After block three is controlled, the Enterprising, Artistic, and Social environments have betas that are statistically significant ($p<.01$). It is hardly surprising that the Enterprising type has a positive effect since this type enjoys manipulating others to attain organizational goals. The Artistic type has a negative effect because this type tends to be nonconforming and prefers to "cope with others in a personal, emotional, expressive, and unconventional way" (Holland, 1973, p. 31). The Social environment also has a negative effect in spite that Social types like to work with people as the Enterprising types do. The reason is that these two types differ in the nature of their relationships with people. The Social types take more equitable and sympathetic attitudes toward people and are friendly, helpful, and

understanding, whereas the Enterprising types interact with people in order to achieve their personal or organizational needs and are more dominating and authoritarian.

Table 3

Six Types of Academic Majors and the Value of Administrative Leadership: standardized regression coefficients

	β after controlling for block			
	1	2	3	4
Majors that enter the regression				
Enterprising	.13***	.12***	.12***	.10***
Artistic	-.07***	-.06***	-.06***	-.03*
Conventional	.03*	02	02	03*
Majors that do not enter the regression				
Realistic	.00	-.01	-.01	.00
Investigative	-.05**	-.02	-.02	.01
Social	-.04**	-.05**	-.04**	-.03

Note. Multiple R=.43

Other variables that enter the regression are as followed.

Block 1 : pretest

Block 2 : students' background characteristics
(mother's education, being Black, being Mexican, SAT composite score, sex role attitudes, being Catholic)

Block 3 : institutional structural characteristics
(Male-only institutions, special institutions)

*p<.05, **p<.01, ***p<.001

After the Artistic environment is taken into account, the beta of the Social environment drops to statistical insignificance. This occurs because the Artistic and Social types are so similar that the Social type cannot contribute significant prediction beyond what the Artistic type has already provided. Consequently, the Conventional environment which is more different from the Artistic type than the Social type enters the regression instead. The Conventional environment has a positive influence on administrative leadership because this type is characterized by a strong identification with power and

status. Being able to take charge is the ultimate goal of the Conventional workers, although most of them follow rather than lead others at work.

Expression of Artistic Creativity

Table 4 shows the results of the regression on expression of artistic creativity. As expected, the Artistic environment has a strong and positive effect on this value. The Conventional environment, being very dissimilar to the Artistic one, comes out as the second predictor and has a negative effect. Other types also have negative effects. Researchers who factor analyzed instruments based on the RIASEC types, such as Edwards and Whitney (1972) on Holland's Self-Directed Search and Lunneborg and Lunnborg (1975) on Vocational Interest Inventory, consistently found the Artistic type to be far from all other types and to form a separate factor by itself. This explains well the current finding that the Artistic type exerts an unique influence on this value.

Among all types, the Social type probably has the shortest psychological distance from the Artistic type because they both stress self-expression. However, the Social types do it directly through people, not indirectly through some medium as the Artistic types. Therefore, if the measure of this value in this study were to include self-expression in non-artistic fields, the Social environment may have a positive effect instead.

Table 4

Six Types of Academic Majors and the Value of Expression of Artistic Creativity: standardized regression coefficients

	β after controlling for block			
	1	2	3	4
Majors that enter the regression				
Artistic	.21***	.21***	.21***	.15***
Conventional	-.06***	-.06***	-.06***	-.07***
Investigative	-.09**	-.09***	-.09***	-.09**
Enterprising	-.05**	-.04**	-.04**	-.06**
Realistic	-.05**	-.03*	-.03*	-.04**
Social	-.05**	-.04*	-.03*	-.05**

Note. Multiple R=.52

Other variables that enter the regression are listed as followed.

Block 1 : pretest

Block 2 : students' background characteristics (being Black, being White, being Mexican, being female, father's education, father's career as a businessman, SAT composite score, sex role attitudes, being Protestant)

Block 3 : institutional structural characteristics (liberal arts colleges)

*p<.05, **p<.01, ***p<.001

Altruism

The results of regression on the value of altruism are reported in Table 5. When the pretest score, students' background characteristics, and institutional structural characteristics are held constant, the Social environment has a positive effect on this value whereas the Conventional and Investigative environments have negative effects (see betas under the column of block three). The Realistic and Enterprising environments are also slightly negatively related to this value but not in a statistically significant way.

Granted that model environments vary in the priorities they assign to different work values, the absence of positive departmental influence on altruism is still a cause for serious concern because it has multiple implications for individual and society. For example, although the conventional jobs involves organizing data, such as accountants and

secretaries, there is also much contact with people in their jobs. It is wondered if these people would have high degrees of job satisfaction, or if the quality of service they render is desirable, if the Conventional environment reduces students' interest in helping others in difficulty. Also, the negative effect of the Investigative environment on altruism may affect negatively the recruitment and retention of students who are prone to help others. Women are particular likely to be discourage from taking these fields because they are more concerned about helping others than men (Rosenberg, 1957). In fact, scientific and theoretical fields of work (the Investigative jobs) are useful to people because they better the quality of human life through advancement in technologies and science. This indirect relationship between their work and helping others needs to be articulated more clearly.

Table 5

Six Types of Academic Majors and the Value of Altruism:

standardized regression coefficients

	β after controlling for block			
	1	2	3	4
Majors that enter the regression				
Social	.08***	.07***	.07***	.03***
Conventional	-.05***	-.06***	-.06***	-.05**
Majors that do not enter the regression				
Realistic	-.02	-.03	-.03	-.02
Investigative	-.06	-.04*	-.04*	-.03
Artistic	-.01	-.00	-.00	.00
Enterprising	-.02	-.02	-.02	-.00

Note. Multiple R=.44

Other variables that enter the regression are listed as followed.

Block 1 : pretest

Block 2 : students' background characteristics
(being Black, being female, being Caucasian, SAT composite score)

Block 3 : institutional structural characteristics
(research university, male-only institutions)

*p<.05, **p<.01, ***p<.001

Summary

To investigate the influence of academic majors on undergraduate work values, this study uses Holland's classification scheme of occupations to categorize majors into Holland's six model environments and to pose hypotheses. The results indicate that Holland's theory is capable of providing the focus and cohesion necessary for this vital research area to progress toward a more systematic level of inquiry. Most of the effects observed are in the expected direction. The only exception is that there is no significant difference among the six model environments in career eminence. Career eminence as a goal transcends occupational boundaries. This highlights the importance to understand the nature of a work value by the way it is perceived.

An interesting finding of this study is that there is no perfect correlation between the traits of the model environments and their actual reinforcement effects. A model environment may be populated by a certain kind of people, but this environment does not necessarily enhance its associated attributes of these people. For example, the Conventional type does not have a significant effect on financial success in spite of its high mean score in this value. On a related manner, there is considerable variability in the effectiveness of the departmental environments regarding their reinforcement of their respective patterns of occupational values. The reinforcement effect of the Enterprising environment on financial success and administrative leadership are comparatively stronger than that of the Social environment on altruism, or that of the Artistic environment on expression of artistic creativity. While this entails an issue regarding how to better predict the differences among the six types with regard to different work values, this also raises a question about what makes a model environment more powerful in value socialization than others.

The relative strengths among six model environments in shaping undergraduate work values may have to do with a concept recently added to Holland's theory -- "identity" (Holland, 1984). "For people, identity is defined as the possession of a clear and stable

picture of one's goals, interests, and talents. For environments, identity is defined as the organization's clarity, stability, and integration of goals, tasks, and rewards" (Brown, Brooks and Associates, 1990, p. 45). Environment with a high degree of identity may exert a stronger socializing force on students because studies (Hargens, 1975) suggest that cohesion and collective consensus are essential to the reinforcement efforts of environments.

In this light, if academic majors wish to enhance their socialization power on students' value development, it is crucial that they increase their degrees of identity. More specifically, they need to establish a clear image of who they are, articulate their goals, values, and expectations to students and faculty, and implement these goals and objectives unfailingly and consistently through what Astin (1989) calls explicit and implicit curriculum. Explicit curriculum refers to mission statements and formal courses of study offered to students while implicit curriculum includes "the teaching methods we used, how we grade and test our students, and how we treat each other as professional colleagues" (p.24). Furthermore, these expressed objectives should also work in concert with each other. Otherwise, if an academic department has stated goals that are in conflict with each other, that department cannot have a high degree of identity and thus, cannot produce a pronounced effect on students.

Limitations

While this study improves some limitations of previous studies in this area, it is also limited in other ways. The first two limitations of this study are related to the dependent variables, which are students' work values. Ideally, they should be measured by more specifically phrased questions, such as "what job characteristics are important to you in selecting a career?". As a secondary analysis, however, this study uses values and

goals that are broad in sense as substitutes. Although general life values and work values are closely related (Kinnane and Gaubinger, 1963), there is still room for improvement on the precision of measurement.

On a related manner, because it is confined to an existing database, this study is restricted in its ability to examine more than five work values. Although the five work values in this study are typical work goals which cover the traditional extrinsic, intrinsic, and people-related three dimensions of work values, more work values need to be explored in order to depict a general pattern about college students' work values and the influence of the departmental environment on them. Other work values worthy of notice include security, promotion, autonomy, variety, the challenges and interest of job, associates and so on.

Another limitation of this study is related to academic majors. This study uses the major in the senior year as a proxy for the influence of departmental environment because it is closely related to the occupational fields that students are going to enter after graduation. Also, Walsh, Vaudrin, and Hummel (1972) finds that student change as a result of the influence of their intended academic majors during the first year is limited because students are not fully committed to an academic major at that time. Yet, individuals may vary widely in their degrees of involvement in departmental environment because a large number of students change their majors during their college years. This individual variance is not considered in this study.

One way to take into control this individual variance is to measure students' length and depth of exposure to departmental environment. This study is limited to do so because the CIRP1985-89 database that this study uses does not offer such measures. Another way is to add both initial and final majors to the regression analyses. While it is possible to do so technically, this study prefers not to because the results may be biased. Majors that have an earlier point of entry into the regression analyses may appear more influential because they take away most of the variance that they share with majors that are added to the

regressions at a later point. It seems more appropriate that researchers either take one kind of majors or the other, depending upon the nature of the question asked. This study chooses the final majors because its purpose is to study work values. Although some information may be lost this way, this is the best option that this study can make.

Finally, Holland (1969) proposes that personalities and environments can be better defined with more subcategories attached to the main six categories. A researcher can use a three-letter, four-letter, or even five-letter code to improve precision of description. This study chooses to stay with the main six categories because a large number of types may entail a high degree of multicollinearity in multiple regression analyses, given the fact that these types are closely related to each other. Future researchers may consider adopting a multi-digit classification scheme if their analytical methods allow.

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